



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/569,494

02/27/2006

Motoi Totiba

1254 034PUS1

3470

2292 7590 09/05/2008
BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

RIGGS II, LARRY D

ART UNIT

PAPER NUMBER

1631

NOTIFICATION DATE

DELIVERY MODE

09/05/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/569,494	Applicant(s) TOTIBA ET AL.	
	Examiner LARRY D. RIGGS II	Art Unit 1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>13 July 2006, 27 February 2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

The Figures 3-6, 9 and 11 are objected to because they are illegible. Specifically, Figure 3 provides darkened areas that make 301 indistinguishable from 302 and 305 indistinguishable from 306. Figure 4 provides darkened areas that make 402 indistinguishable from 405. Figure 5 provides darkened areas that make 501 indistinguishable from 503. Figure 6 provides darkened areas that make 602 indistinguishable from 603. Figure 9 provides darkened areas that make the entire figure hard to read. Figure 11 provides darkened areas that make 1101 indistinguishable from 1103.

Drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the

Art Unit: 1631

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code, (see specification, pages 17, 29 and 33).

Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4, 6, 7, 13 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation “the results” in line 2. There is no clear antecedent basis for said limitation because claim 2, line 4, part (B) recites “clusters obtained as a result of clustering of events”. It is unclear what “the results” pertains because only one result was obtained in part (B) of claim 2.

Claim 6 recites the limitation “the reduction of data in the data field of the character type” in lines 1-2. There is insufficient antecedent basis for this limitation in the claim because claims 1-3 do not recite these limitations.

Claim 7 recites the limitation “the reduction of data in the data field of the numerical value type” in lines 1-2. There is insufficient antecedent basis for this limitation in the claim because claims 1-3 do not recite these limitations.

Claim 7 recites the limitation “the exponential portion of the value” in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitation “associating values in a certain range” in lines 3-4. The metes and bounds of the limitation are unclear as to what values are to be associated because the claim previously recites only a single value, and claims 1-3 do not recite a value or values.

The term “arbitrary significant digit” in claim 7, lines 2-3, is a relative term which renders the claim indefinite. The term “arbitrary” is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim 13 recites the limitation “the feature quantity...represented by...elements consisting of values or text, or a feature quantity that expresses the three-dimensional structure of a molecule” in lines 2-4. The metes and bounds of the limitation are unclear as to how a feature quantity can be represented by “a feature quantity that expresses...”.

Claim 14 recites the limitation “the known information” in line 5. There is no clear antecedent basis for the limitation because only “related known information” was previously recited in the claim.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 14 and 15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 14, a database is merely a compilation of data, which is interpreted as nonfunctional descriptive material. Incorporating a function for searching the database is equivalent to a software program within the database.

Data structures not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. See, e.g., Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory). Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized. See nonfunctional descriptive material under MPEP 2106.1.

Thus, claim 14 is nonstatutory.

Claim 15 is drawn to a computer readable medium comprising computer software configured implement the methods of claim 1, 12 and provide the database of claim 14. The instant specification does not define the scope of the limitation of "computer readable recording medium". Thus, one skilled in the art would understand that computer readable medium includes carrier wave, which is a signal. For example, Fiekowsky et al., in US patent 6,090,555 (Date of Patent: July 18, 2000), define

Art Unit: 1631

computer readable medium as being “a CD-ROM, floppy disk, tape, flash memory, system memory, hard drive, and a data signal embodied in a carrier wave.” See column 14, claim 12. Bornstein et al., in US patent 6,1443,88 (Date of patent : Nov. 7, 2000) state, “The computer readable medium of the present invention generally includes a tape, a floppy disk, a CD ROM, a carrier wave. In a preferred embodiment, however, the computer readable medium of the present invention is a carrier wave.” See column 8, lines 33-37. See column 8, lines 33-37. See, e.g., In re Nuitjen, Docket no. 2006-1371 (Fed. Cir. Sept. 20, 2007)(slip. op. at 18)(“A transitory, propagating signal like Nuitjen’s is not a process, machine, manufacture, or composition of matter.’ ... Thus, such a signal cannot be patentable subject matter.”).

Therefore, at least one embodiment of the instant claim 15 is drawn to carrier wave or a signal encoded thereon a computer program.

It was held by the court that claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such, are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material, e.g. a computer program, falls within any of the categories of patentable subject matter set forth in § 101. The following analysis on why such a signal encoded with functional descriptive material is nonstatutory subject matter is excerpted from the US PTO's "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter

Art Unit: 1631

Eligibility" (OG Notices: 22 November 2005, available from the US PTO website at

<http://www.uspto.gov/web/offices/com/sol/og/2005/week47/og200547.htm>):

First, a claimed signal is clearly not a "process" under § 101 because it is not a series of steps. The other three § 101 classes of machine, compositions of matter and manufactures "relate to structural entities and can be grouped as 'product' claims in order to contrast them with process claims." 1 D. Chisum, Patents §1.02 (1994). The three product classes have traditionally required physical structure or material.

"The term machine includes every mechanical device or combination of mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." Corning v. Burden, 56 U.S. (15 How.) 252, 267 (1854). A modern definition of machine would no doubt include electronic devices which perform functions. Indeed, devices such as flip-flops and computers are referred to in computer science as sequential machines. A claimed signal has no physical structure, does not itself perform any useful, concrete and tangible result and, thus, does not fit within the definition of a machine.

A "composition of matter" "covers all compositions of two or more substances and includes all composite articles, whether they be results of chemical union, or of mechanical mixture, or whether they be gases, fluids, powders or solids." Shell Development Co. v. Watson, 149 F. Supp. 279, 280, 113 USPQ 265, 266 (D.D.C. 1957), aff'd, 252 F.2d 861, 116 USPQ 428 (D.C. Cir. 1958). A claimed signal is not matter, but a form of energy, and therefore is not a composition of matter.

The Supreme Court has read the term "manufacture" in accordance with its dictionary definition to mean "the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery." Diamond v. Chakrabarty, 447 U.S. 303, 308, 206 USPQ 193, 196-97 (1980) (quoting American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 11, 8 USPQ 131, 133 (1931), which, in turn, quotes the Century Dictionary). Other courts have applied similar definitions. See American Disappearing Bed Co. v. Armaelsteen, 182 F. 324, 325 (9th Cir. 1910), cert. denied, 220 U.S. 622 (1911). These definitions require physical substance, which a claimed signal does not have. Congress can be presumed to be aware of an administrative or judicial interpretation of a statute and to adopt that interpretation when it re-enacts a statute without change. Lorillard v. Pons, 434 U.S. 575, 580 (1978). Thus, Congress must be presumed to have been aware of the interpretation of manufacture in American Fruit Growers when it passed the 1952 Patent Act.

Art Unit: 1631

A manufacture is also defined as the residual class of product. 1 Chisum, § 1.02[3] (citing W. Robinson, The Law of Patents for Useful Inventions 270 (1890)). A product is a tangible physical article or object, some form of matter, which a signal is not. That the other two product classes, machine and composition of matter, require physical matter is evidence that a manufacture was also intended to require physical matter. A signal, a form of energy, does not fall within either of the two definitions of manufacture. Thus, a signal does not fall within one of the four statutory classes of § 101.

These interim guidelines propose that such signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of § 101. Public comment is sought for further evaluation of this question.

Thus, claim 15 is drawn to nonstatutory subject matter.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

Art Unit: 1631

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-10 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ge et al. (Nature Genetics, 2001, 29, 482-486) in view of Cushing et al. (US 2005/0010566).

The instant claims provide a method for visualizing correlation data concerning two biological events or the correlation data and feature data regarding each event in a matrix format, the method comprising displaying correlation data concerning biological events of the same or different kinds, or the correlation data and feature data regarding each biological event in (a) one of a plurality of prepared data display formats and at (b) one of a plurality of prepared summarization levels, both of which are selected either manually or automatically depending on the number of data items in desired display data.

Regarding claims 1 and 9, Ge et al. shows a transcriptome-interactome correlation mapping strategy of displaying pair-wise combinations between the clusters of an expression profiling experiment, with numbers assigned to each cluster in rows and columns of the matrix along with the number of genes each cluster contains in parenthesis, wherein the table on the right shows protein interaction pairs together

Art Unit: 1631

(feature data) with the expression cluster to which the corresponding genes belong (correlation data), wherein these expression clusters and corresponding genes are displayed simultaneously, (page 482, right column, last paragraph - page 483, left column, first paragraph; Figure 1).

Ge et al. does not show summarization levels.

Cushing et al. shows a summarization level of each row of data, based on rules, that indicates the level of summarization of the data, (paragraphs 155-171).

Regarding claim 2, Ge et al. shows a table of an interaction pair (A), a table of clusters of an expression profiling experiment (B), and a table showing the probability for obtaining at least k observed groups in the intracluster region by chance (C) (Figure 1; Table 1).

Regarding claim 3, Ge et al. shows a two-dimensional matrix by organizing clusters derived from a set of related transcriptional profiling experiments into two identical axes, wherein pairs of genes whose product can interact, according to the clusters to which each gene belongs, (correlation info); For each square, an index of protein interaction density (PID) as the ratio of the number of observed protein interaction pairs to the total number of possible pair-wise combination of protein pairs is calculated (attribute information), (page 483, left column, first paragraph).

Regarding claim 4, Ge et al. shows transcriptome-interactome correlation maps, with calculated protein interaction density (PID) for each square in the matrix as the ratio of interaction of pairs assigned to the square (IP) over the total number of protein

Art Unit: 1631

pairs possibly formed by combination of the genes in the square (PP) and running diagonally from left to right and indicated by color, (Figure 2).

Regarding claim 5, Ge et al. shows data reduced to a character type (protein interaction pairs) and numeric value type (numbers assigned to each cluster, number of genes each cluster contains, (Figure 1).

Regarding claims 6 and 7, Ge et al. shows character type (protein interaction pairs) and numeric value type (numbers assigned to each cluster, number of genes each cluster contains in a layered structure, a keyword (ORF), rounding values to significant digits and signs or colors indicating ORF pairs, (Figures 1-3, Table 1).

Regarding claim 8, Cushing et al. shows a mechanisms which the results of a multidimensional query are processed such that their format and contents accurately reflect the semantics of an entity/relationship report specification, provides such that the tabular and cross-tabulated reports may be executed using an online analytical programming query, (paragraph 25).

Regarding claim 10, Ge et al. shows protein-protein interactions and clustering analysis data sets of cell cycle-regulated genes, meiosis-regulated genes and cell stress-regulated genes, (page 485, right column, second paragraph). However, it would be obvious that the same display method could be produced with protein-compound interactions, wherein the compounds where of low molecular weight.

Regarding claims 12 and 13, Ge et al. shows that a feature quantity common to members of the cluster are the proteins produced by the genes of the cluster, interact with one another, (abstract, Figure 1). Ge et al. shows a plurality of genes that encode

a plurality of interacting proteins wherein these PIDs are expressed in color, (Figures 2-3).

Regarding claim 14, Ge et al. shows protein-protein interaction data pairs described in literature collected in YPD and MIPS, deemed the literature data set, and transcriptome-interactome correlation mapping indicating combination of genes form the same clusters resulting in a higher PID, (page 483, right column).

Cushing et al. shows a database server structured to access raw data stored in the database, a report server to generate reports and obtain information pertaining to the data in the database, wherein the summarization level enables aggregation of fact values and organization of hierarch of levels of the data within a report, (paragraphs 24-37).

Regarding claim 15, Ge et al. provides a k-means algorithm for clustering analysis with the yeast cell-cycle expression data, (page 483, left column, last paragraph).

Cushing et al. shows a computer readable medium having computer readable code embodied for use in the execution of a method of transforming results of a query into results of a report, (paragraph 14, claim 10).

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to modify the transcriptome-interactome correlation mapping method by Ge et al. with the summarization levels of Cushing et al. because Cushing et al. shows the importance of clustering (grouping) data based on attributes into a hierarchy of levels and aggregating fact values at different levels of summarization, and a person

Art Unit: 1631

of ordinary skill in the art would understand that visualizing data with the aid of levels of summarization would enable better visualization of the correlation of data, (Cushing et al., paragraph 37).

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ge et al. (Nature Genetics, 2001, 29, 482-486) in view of Cushing et al. (US 2005/0010566) as applied to claims 1-10 and 12-15 above, and further in view of Artymiuk et al. (J. Mol. Biol., 1994, 243, 327-344).

The instant claim 11 depends from claim 1 with the extra limitation that wherein as the biological events, a structural unit is defined on the basis of atoms in a molecule or a set of atoms in a molecule for each molecule in a complex of one or more molecules, a representative position of the structural unit is defined on the basis of the coordinates of atoms of which the structural unit is composed, and information about the distance between the representative positions of the structural units is displayed in the cells in the matrix, said matrix having each of the structural units as elements in the rows and columns thereof.

Ge et al. and Cushing et al. are applied to claims 1-10 and 12-15 above. Ge et al. and Cushing et al. do not show a matrix with rows and columns of cells encompassing structural units of molecules, wherein the structural unit are atom(s) in a molecule, with information about distances between structural units.

Artymiuk et al. shows a matrix with rows and columns of cells encompassing structural units of a protein, wherein the structural units are the atoms of amino acids

Art Unit: 1631

(Histidine 57, Serine 195 and Aspartate 102) encompassing a serine-protease catalytic triad, and providing distances between the respective structural units, (page 331; Figures 2-3).

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to modify the transcriptome-interactome correlation mapping method by Ge et al. with the summarization levels of Cushing et al. and the matrix of structural units with respective distances by Artymiuk et al. because Cushing et al. shows the importance of clustering (grouping) data based on attributes into a hierarchy of levels and aggregating fact values at different levels of summarization, and a person of ordinary skill in the art would understand that visualizing data with the aid of levels of summarization and the aid of matrices with corresponding structural units would enable better visualization of the correlation of data, (Cushing et al., paragraph 37; Artymiuk et al. Figures 2-3 and 6).

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LARRY D. RIGGS II whose telephone number is (571)270-3062. The examiner can normally be reached on Monday-Thursday, 7:30AM-5:00PM, ALT. Friday, EST.

Art Unit: 1631

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on 571-272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Shubo (Joe) Zhou/
Primary Examiner, Art Unit 1631

/LDR/
Larry D. Riggs II
Examiner, Art Unit 1631